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SMART WATER MANAGEMENT SYSTEM

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Abstract

The efforts required in achieving required output can be effectively and economically be decrease by the implementations of better designs. If you design well of the project then will easily be able to create your project in less time with respect toothers. So, it is very important to create your designs or patterns first. Over the past few years, IoT has become one of the most important technologies of the 21 st century. Now that we can connect everyday objects Kitchen appliances, cars, thermostats, baby monitors to the internet via embedded devices, seamless communication is possible between people, process, and things. By means of low-cost computing, the cloud, big data, analytics, and mobile technologies, physical things can share and collect data with minimal human intervention. In this hyper connected world, digital systems can record, monitor and adjust each interaction between connected things. The physical world meets the digital world --- and they cooperate. IoT (Internet of Things) is an advanced automation and analytics system which exploits networking, sensing, big data, and artificial intelligence technology to deliver complete systems for a product or service. These systems allow greater transparency, control, and performance when applied to any industry or system. IoT systems have applications across industries through their unique flexibility and ability to be suitable in any environment. They enhance data collection, automation, operations, and much more through smart devices and powerful enabling technology IoT systems allow users to achieve deeper automation, analysis, and integration within a system. They improve the reach of these areas and their accuracy. IoT utilizes existing and emerging technology for sensing, networking, and robotics. IoT exploits recent advances in software, falling hardware prices, and modern attitudes towards technology. Its new and advanced elements bring major changes in the delivery of products, goods, and services; and the social, economic, and political impact of those changes

I. INTRODUCTION

1.1 GENERAL INTRODUCTION

This project aims to learn how to save water from continuous degradation. Smart water management is essentially a system designed to gather meaningful and actionable data on the flow, pressure and distribution of a city's water. Its main goal is to ensure that the infrastructure and energy used to transport water are managed effectively. Nowadays, every individual is using water and making some mistakes like when they are using for some purpose such as bathing, for fresh or many more. They leave the tap opened until unless their works did not complete. They don't have idea that water is degrading time by time and will not be available for the next generation event it might be problem for ourselves but they are ignoring this and thinking that water is renewable resources and can be renew time by time or many more. So, for saving water we all need to do something better than older techniques rather than spread awareness. Our team decide to make an IoT based things that will help people save water even if you don't want to do. And finally, we named it "Smart Water Management System".

1.2 LITERATURE SURVEY

In this paper Smart Water Management system using Microcontroller ESP8266 as IoT Solution presents that system operates through the smart monitoring of the water flow in pipes of the water distribution network, aiming to ensure the quality of the water supply, knowing that water losses characterize one of the great problems in the world, as pipe holes may be open doors to water contaminants.

In the Water Management system, IoT, automation is one of the essential attributes. This increases comfort and convenience in the lives of people. We would like to provide this in the domain of water management. Our motive is to help the readers understand the importance of using water judiciously and equipping them with the knowledge of the functioning of water management system which is done by using Internet of Things (IoT).

OPC UA (Object Linking and Embedding for Process Control Unified Architecture) is a platform independent service-oriented architecture for the control of processes in the logistics and manufacturing sectors. Based on this standard we propose a smart water management model combining Internet of Things technologies with business processes coordination and decision support systems. They provide an architecture for sub-system interaction and a detailed description of the physical scenario in which we will test our implementation, allowing specific vendor equipment to be manageable and interoperable in the specific context of water management processes.

Water is always a crucial part of everyday life. Due to global environmental situation, water management and conservation is vital for human survival. In recent times, there were huge needs of consumer based humanitarian projects Water is always a crucial part of everyday life. Due to global environmental situation, water management and conservation is vital for human survival. In recent times, there were huge needs of consumer based humanitarian projects.

III. SYSTEM MODELING

System modeling is a fundamental aspect of systems engineering, involving the creation of abstract representations to comprehend the behavior,structure, and interactions within a system. Thisprocess assists engineers and analysts in analyzing, designing, and optimizing complex systems before implementation.

The selection of a specific model type depends on the nature of the system and the objectives of the analysis. The purpose of system modeling encompasses various key aspects. Firstly, it aids in understanding the system's structure and behavior, providing a conceptual framework for system

comprehension. Secondly, models play a crucial rolein the design and optimization of systems, enabling engineers to refine and enhance systemperformance. Lastly, the selection of a specific model type depends on the nature of the system andthe objectives of the analysis

models serve as a communication tool among stakeholders involved in the system development process, facilitating effective collaboration and understanding. Several types of system models caterto different aspects of system analysis. Mathematical models represent systems using mathematical equations and expressions, offering a quantitative
perspective. Simulation models emulate system behavior over time, allowing experimentation without real-world implementation. Graphical models utilize visual representations, such as block diagrams or flowcharts, to illustrate system components and interactions.

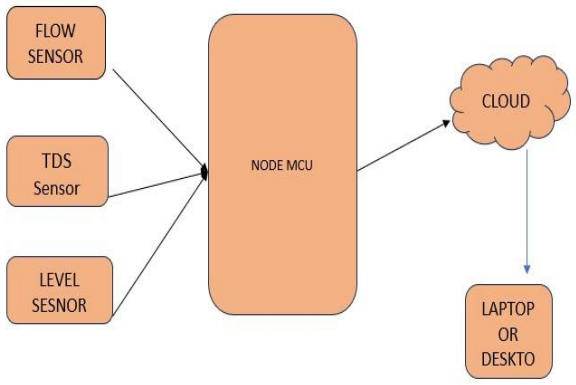
Physical models involve creating tangible prototypes for testing and analysis. Key elements insystem model include identifying and defining system components, describing relationships between these components, setting boundaries to define the scope of the system, and identifying inputsand outputs that influence and are produced by the system, respectively.

These elements collectively contribute to a comprehensive understanding of the system being modeled. Various modeling tools and languages are available to aid in creating system models. Unified Modeling Language (UML) and Systems Modeling Language (Sys ML) are popular notations for graphical representation, while simulation tools like

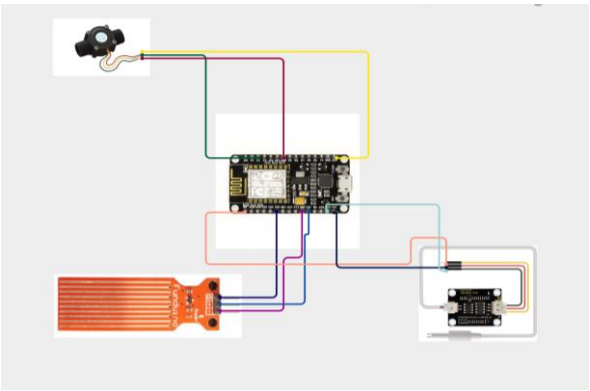
MATLAB/Simulink provide a platform for dynamic modeling and analysis.

System modeling is an iterative process that evolves over time. As understanding deepens orrequirements change, models are refined and updated to accurately reflect the evolving nature of the system. This iterative approach ensures that the models remain relevant and aligned with theevolving understanding and needs of the system

System modeling is a multifaceted process essentialfor systems engineering. It serves purposes ranging from comprehension and design to optimization and communication. The variety of model types, encompassing mathematical, simulation, graphical, and physical models, allows for flexibility in addressing different aspects of system analysis
The key elements within system modeling and the availability of modeling tools contribute to creating a holistic understanding of complex systems, ultimately facilitating informed decision-making and efficient system development.



Block Diagram



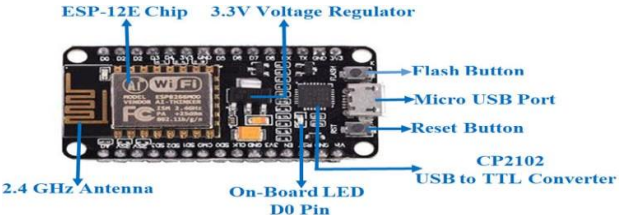
Circuit Diagram

Circuit Diagram of Wi-Fi controlled robot is given below. We mainly need a NODEMCU and ESP8266 Wi-Fi module. ESP8266's Vcc and GND pins are directly connected to 3.3V and GND of Node MCU and CH_PD is also connected with 3.3V. Transmitter and Receiver pins of ESP8266 are directly connected to pin 2 and 3 of NODEMCU. Software Serial Library is used to allow serial communication on pin 2 and 3 of Arduino. We have already covered the Interfacing of ESP8266 Wi-Fi module to NODEMCU in detail.

IV. REQUIREMENTS

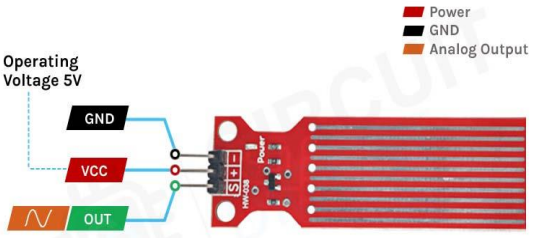
HARDWARE REQUIREMENTS

- 1.NODE MCU ESP8266
- 2.FLOW SESNOR
- 3.TDS SENSOR
- 4.WATER LEVEL SESNOR



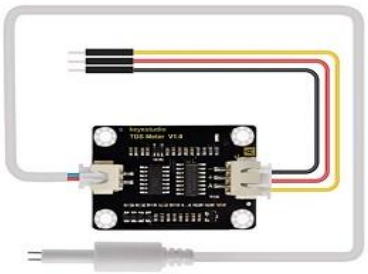
Node Mcu

Microcontroller (ESP8266): The microcontroller processes data from sensors, performs calculations, and communicates with other devices or a central server.
It also includes in built WIFI module from which it easy connect to internet.
And with the help of internet, it sends the data to cloud for storing and real time monitoring.



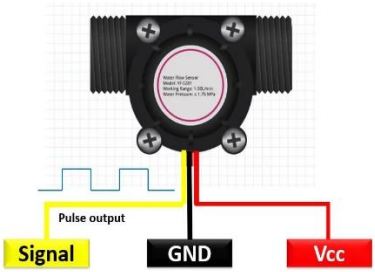
Water Level Sensor

Water level sensor helps to read the exact volume of water available in tanks. It reads the data and send to microcontroller for processing and decision making.This sensor show the exact amount of water available in the tank. And send reading to server. Server shows us the value.



TDS Sensor

TDS Sensor detects the Total Dissolved Solids (TDS) levels in the water which can be used to indicate the water quality. It also collects data from water send to microcontroller for decision making.



Water flow sensor consists of a plastic valve body, a water rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls. Its speed changes with different rate of flow. The hall-effect sensor outputs the corresponding pulse signal. This one is suitable to detect flow in water dispenser or coffee machine. We have a comprehensive line of water flow sensors in different diameters.

Working

Undertaking the development of a WIFI-based smart water management surveillance system using a camera has been an incredibly rewarding journey, filled with challenges, discoveries, and moments of profound insight. As I reflect on the extensive work poured into this project, I am compelled to share my final thoughts and reflections on the process, achievements, and future implications of this endeavor. The journey began with a spark of inspiration ignited by a deep-seated fascination with robotics, IoT technologies, and the potential applications of remote surveillance systems. The desire to explore the intersection of hardware and software, coupled with the opportunity to contribute to the advancement of technology, served as the driving force behind embarking on this ambitious project. It was this initial motivation that propelled me forward through the myriad challenges and obstacles encountered along the way. The development process of the WIFI-based smart water management system was characterized by its complexity and multifaceted nature. From selecting the appropriate hardware components to designing the firmware architecture and implementing communication protocols, each step presented its own set of challenges and obstacles to overcome. However, it was through overcoming these challenges that the most rewarding moments were found.

RESULT

Monitoring varicose veins using IoT (Internet of Things) involves the use of connected devices and sensors to track various parameters related to the condition.

Overall, IoT-enabled monitoring of varicose veins offers the potential for early detection of complications, personalized treatment plans, and improved patient outcomes through proactive management.

CONCLUSION

In this paper we presented the MEGA initiative for defining a reference architecture for water management based on integrating IoT capabilities to achieve a scalable and feasible industrial system. We define the management exploitation layer, coordination layer, subsystems layer and administration layer and the interfaces that enable layer interaction. We also consider the physical model, which defines the physical elements executing water management processes in a hierarchical way, and also, the process model, which organizes the execution of particular processes in water management subsystems.

FUTURE SCOPE

In this work, Wi-Fi will be a key access technology for Internet of Things enablement due to cost coverage and bandwidth, challenges with mobile cellular which can be compromised through Wi-Fi. The motion of robot controlling via internet is one of the easy means as it requires the user to access the designated webpage to guide it. This system can be used in defense applications for detecting landmines in war field and for bomb detections by mounting a metal detector sensor on it. Further, the size of device can be miniaturized based upon specific applications. Further, the simulation of proposed work has been carried out using ARDUINO software and experimental values are validated with simulation
parameters.

ADVANTAGES AND APPLICATIONS OF PROPOSED TECHNIQUE

• The proposed Wi-Fi controlled system Can control it using smart mobile – high efficiency –
Power consumption is very less – It's easy to make further implementation with this robot

• The Microcontroller text input and gives output to the Wi-Fi module. Here by directional arrow has been between the Microcontroller and Wi-Fi module. Motor Driver is the by directional arrow has been used between the Microcontroller and Mobile Control Internet.

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